Improving comfort in nursing home residents with dementia and pneumonia

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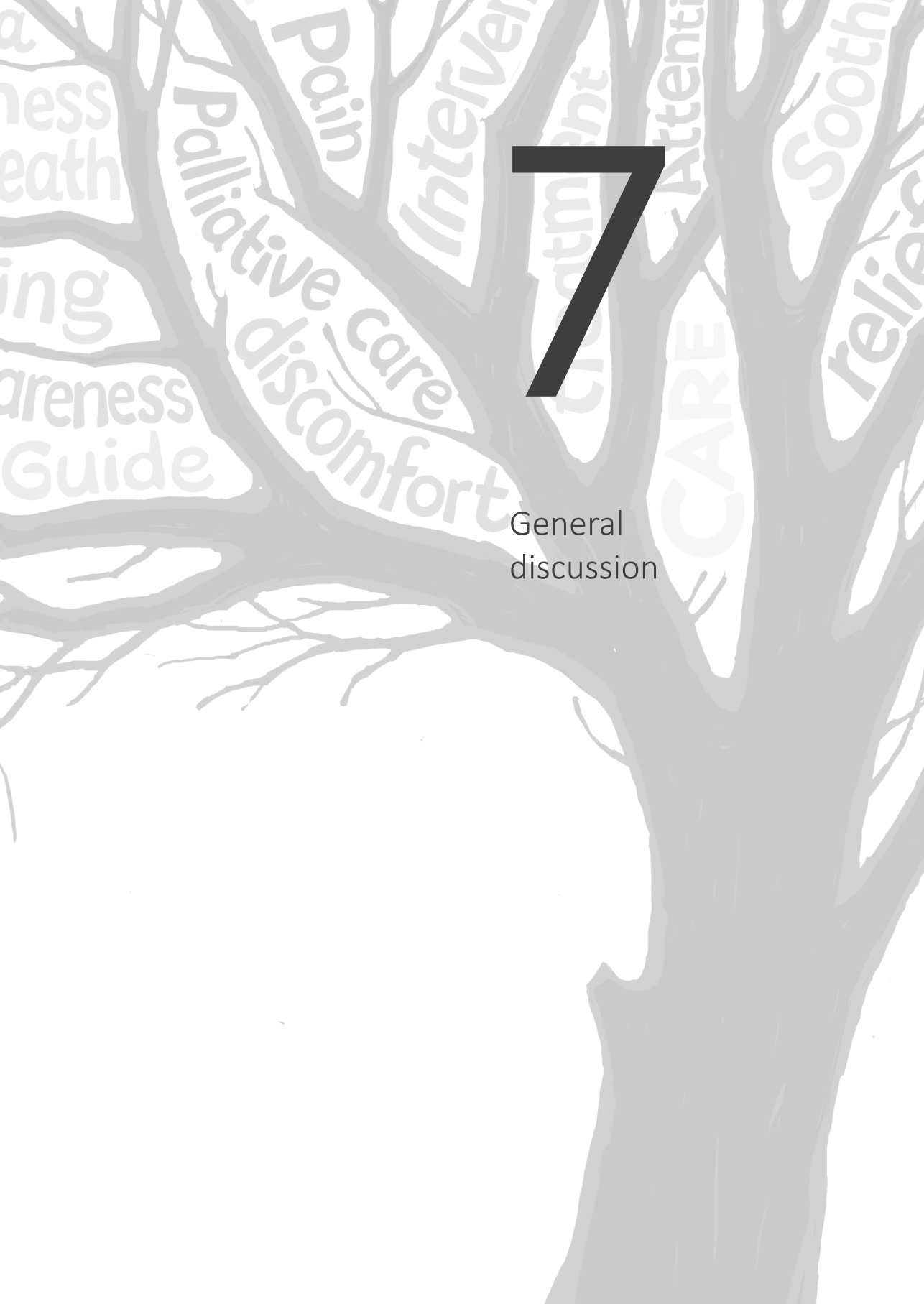

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General discussion

GENERAL DISCUSSION

This thesis provides the results of the PneuMonitor study, with the overall aim to reduce discomfort and symptoms in patients with dementia and pneumonia. The previous chapters described the course of discomfort, the role of antibiotics and ultimately the development, effects and evaluation of a practice guideline for optimal symptom relief. This final chapter discusses and elaborates on the study's main results and their interpretation. Furthermore, it covers the most important methodological issues. Finally, we provide implications and recommendations for practice, and for further research.

MAIN RESULTS

A systematic review of the literature showed that the use of antibiotics in patients with dementia is substantial but varies widely between different countries and settings (Chapter 2). Point prevalence of antibiotic use for patients with dementia ranged from 3.3 to 16.6%, and period prevalence in variable time frames ranged from 4.4% to 88% overall and from 23.5 to 94% before death. For respiratory tract infections, the vast majority (77-91%) of patients with dementia received antibiotic treatment in Dutch and US studies. More severe dementia was associated with using fewer antibiotics in various countries. Associations with aspiration and illness severity differed by country.

Regular, prospective observations of discomfort, (lack of) comfort, pain and shortness of breath (in short: discomfort and symptoms) in nursing home patients with dementia and pneumonia showed that discomfort peaked one day after pneumonia diagnosis, then declined and was stable after ten days (Chapter 3). Discomfort steadily increased in the seven days preceding death, but only for patients who were observed awake. Observed (lack of) comfort, pain and shortness of breath followed a comparable pattern. There were no differences in discomfort between patients who were or were not treated with antibiotics.

The Delphi procedure that was used to develop a practice guideline for optimal symptom relief for patients with dementia and pneumonia comprised two qualitative and three quantitative rounds (Chapter 4). Twenty-four national and international experts in relevant specialties such as elderly care medicine, palliative care and infectious diseases participated in the Delphi study. The experts rated their agreement with 40 statements that addressed the main divergent topics in the practice guideline such as the application of existing guidelines for palliative care developed for other diseases such as cancer, and specific pharmacological treatments. Ultimately, at least moder-

ate consensus was reached for 80% (32/40) of the statements. The project team made the final decisions on the topics that did not reach consensus i.e. the usefulness of oxygen administration, and treatment of rattling breath.

The intervention of the study was a practice guideline for optimal symptom relief, and consisted of a checklist of symptoms, observational instruments to monitor symptoms, and tailored treatment recommendations. The practice guideline was expected to reduce discomfort, (lack of) comfort, pain and shortness of breath by enhancing awareness with regard to comfort, by providing a more structured treatment approach, and by regular observations to monitor symptoms. The use of the practice guideline did not reduce discomfort and symptoms which was the main result of the randomized controlled trial (Chapter 5). Discomfort and symptoms were higher in patients who died within 20 days after pneumonia diagnosis. A significant interaction of the intervention effect with death within 20 days showed that the intervention was least effective in the patients who died within 20 days. In both control and intervention homes, discomfort and symptoms were lower in the intervention phase compared to the pre-intervention phase. Discomfort and symptoms decreased gradually over time, although the largest difference was observed at the transition from the pre-intervention to the intervention phase.

A mixed-methods process evaluation showed that the practice guideline was implemented for 52-70% (Chapter 6). Physicians indicated to have used the guideline for 81% of patients in the intervention group, and were generally satisfied with the guideline and its contents. Nonetheless, physicians perceived a number of major barriers while using the practice guideline. For example, physicians felt they worked already according to the recommendations in the guideline, although certain elements, such as the observational instruments, were not used very often. Other barriers for using the guideline were lack of time, and the hectic pace of the nursing home setting. For these reasons, the guideline was often not used while being with the patient, but as a check afterwards.

METHODOLOGICAL CONSIDERATIONS

This section discusses the study's overall strengths and limitations and some other methodological considerations: the diagnosis of pneumonia, the observational instruments, performance of the observations by independent observers, and the development of the intervention.

Pneumonia diagnosis

Surveillance definitions for pneumonia such as those of McGeer[1] or Stone[2] mostly require new infiltrations with X-ray examination. In our study, pneumonia was rarely radiographically confirmed. Instead, patients with dementia were included by the attending physician when they had a clinical diagnosis of (suspected) pneumonia, i.e. pneumonia was the most likely diagnosis. In Dutch clinical practice, X-ray examination is rarely employed to establish a diagnosis of pneumonia, because Dutch nursing homes lack facilities to perform chest X-ray examination, and hospital transfer to undergo burdensome diagnostic procedures is regarded inappropriate. But, even more important, a clinical diagnosis as applied in this study most closely resembles clinical practice, which is ultimately of relevance in this naturalistic and pragmatic study.

Using the physician's diagnosis only may have led to the inclusion of false positives such as viral pneumonia, heart failure or pulmonary embolism. However, in the Dutch pneumonia study,[3] it was shown in a small sample that as many as 12 of 14 consecutive cases of pneumonia were radiographically confirmed.[3] Additionally, in a US study, clinical diagnosis of pneumonia abstracted from medical charts captured 99% of cases that were identified by other methods such as modified McGeer criteria and antibiotic prescription plus pneumonia-specific signs.[4] Retrospective assessment showed that in our study, 86% of included patients met the McGeer criteria for other lower respiratory infections (not requiring an X-ray).

Observational instruments

The outcomes of the study were assessed using four different observational instruments for discomfort (Discomfort Scale – Dementia of Alzheimer Type: DS-DAT), (lack of) comfort (End Of Life in Dementia – Comfort Assessment in Dying: EOLD-CAD), pain (Pain Assessment In Advanced Dementia: PAINAD) and shortness of breath (Respiratory Distress Observation Scale: RDOS).[5-8] The DS-DAT and the EOLD-CAD address contrasting concepts: discomfort and comfort, but are comparable with regard to the number of positive and negative items. However, in contrast to the DS-DAT, the EOLD-CAD was originally developed for retrospective assessment, i.e. after death, and also includes items about dying: choking, gurgling, difficulty swallowing and shortness of

breath. Although the instrument was developed for patients who have died, it has been used successfully prospectively in patients expected to die,[9,10] and we therefore applied it prospectively for all patients.

The standard deviation (SD) of the EOLD-CAD scores in our study was low compared to the SD we used in the power calculations, which was based on observations in previous research. The majority of patients in our study survived the pneumonia. For them, levels of comfort were generally higher than for those who died, especially after the first two days following pneumonia diagnosis. Therefore, the EOLD-CAD scores were close to its maximum over many of the observations. This may explain less variability in the population and in comfort levels compared to previous studies in which assessments were retrospective, and only for patients who were dying. In our case, this was an advantage as according to power calculations the number of nursing homes we recruited was rather low for assessing differences on the EOLD-CAD. Due to the lower SD in our population we nevertheless detected relevant differences with statistical significance with this instrument.

Levels of discomfort and symptoms

The outcomes discomfort, (lack of) comfort, pain, and shortness of breath were all highly correlated. This is not surprising because item pools regarding facial expressions and body language overlap between the instruments.[11] For the instruments that assess discomfort and (lack of) comfort, no cut-off values have been assessed. However, for the DS-DAT it has been suggested that a score above eight indicates the presence of discomfort.[12] Using this threshold score shows that one day after pneumonia diagnosis, the highest percentage (43.1%) of patients experienced discomfort in the pre-intervention phase of the study, and only on this first observation day, mean levels of DS-DAT scores were above eight. Cut-off values have been assessed for the PAINAD (a score of 2 or higher indicates probable pain) and the RDOS (respiratory distress is present for scores above 3, while scores of 0-2 signify little or no distress).[8,9] Mean levels of pain observations only were above the threshold for pain during the second observation on the day of pneumonia diagnosis. During this observation, 53% of patients had a score of 2 or higher on the PAINAD. According to the RDOS cut-off value and mean RDOS levels, respiratory distress was present for a longer period, e.g. during the first two observation days (day of pneumonia diagnosis, and the day after diagnosis). During the second observation on the day of pneumonia diagnosis, 65% of patients scored higher than 3 on the RDOS. This decreased to 33% on day 6 and 15% on day 10.

These patterns of pain and shortness of breath, and the levels of observed discomfort, suggest that when patients experienced discomfort this was mainly during the first two days following pneumonia diagnosis. However, even on these days mean instrument scores were only just above the cut-off values, and discomfort and symptoms

were probably not particularly high. Therefore, we may question whether there was still room for improvement.

Observers and observing discomfort and symptoms

Regular observations

Ideally, patient observations for the study outcome measures took place twice daily on the first two days, daily until day 10, and one last time at day 13, 14 or 15, also during weekends and holidays. All observers were trained by one of the researchers using the same program assembled by the project team, including an instructional video tape, and the observers practiced with videotaped patients. Due to e.g. late inclusion by the attending physician, or no trained observer being readily available, missing observations was sometimes inevitable. We stressed that the first observation days were the most important. Repeated observations with the DS-DAT are more reliable when performed by the same observer than by different observers, although interobserver reliability was also sufficient.[13] Teams of observers in each nursing home were encouraged to ensure that repeated observations for one patient were whenever possible performed by one or only a few observers. However, the observers did not always manage to do so.

Advantages and disadvantages of independent observers

In previous studies that focused on discomfort in patients with dementia, mostly the attending physicians, who knew patients well, performed the observations.[9,10,12,14] An advantage of these observers is that they can use the patient's status before the pneumonia as a baseline in their observations, and may therefore be in a better position to identify changes in a patient's condition. However, knowing the patient may as well lead to biased observations, for example when the responsible physician is reluctant to score high discomfort in his patient or may change the initial treatments, e.g. when more discomfort is observed than the physician had expected beforehand. Therefore, the outcomes in our study were assessed by independent observers who were unaware about the patients' condition and treatment – whether or not observers were employed by the nursing home where the patient resided.

Working with independent observers in our study made it easier to keep observers blinded for the intervention or control condition. The observers were not involved in the patients' care and treatments. Furthermore, the intervention was carried out by the attending physicians who were instructed not communicate about intervention or control condition on the wards. That said, it was not possible to guarantee blinding of the observers in all nursing homes during all years of data collection. For example, in the cases observations were performed by the researchers, or when observers had close contact with the physicians, e.g. when they were nurse practitioners. A possible

consequence of incomplete blinding would most likely be an overestimation of the intervention effect. However, only in few nursing homes the researchers performed observations, and upon exploration of the data, we found that the effects of the intervention were not different in these nursing homes compared to others.

Development of the practice guideline

The practice guideline for optimal symptom relief was developed in a Delphi study comprising both qualitative and quantitative rounds. The Delphi procedure was very convenient for the development of a consensus based intervention, as it accommodated the contribution of an extensive group of both national and international experts. Moreover, the quantitative rounds enabled quantifying of the divergence on many topics considering the treatment of patients with pneumonia and dementia, and experts could adjust their point of view anonymously.[15,16]

Limitations of the Delphi study

We eventually succeeded in developing a guideline that everyone 'could live with',[17] and were glad to achieve agreement on 80% of divergent statements. The majority of the guideline's recommendations is based on consensus within our international panel. However, a limitation is that for a few recommendations we could not fully comply with the international opinion. For example with regard to the distinction between palliative and symptomatic care goals.[18] Moreover, for the treatment of 'death rattle' international opinions diverged, as the approach of Dutch panellists in general showed to be less active than is internationally accepted.

Despite our efforts to recruit experts in all relevant topics for the guideline, i.e. palliative care, elderly care medicine, general practice, pharmacy and nursing, the panel did not comprise specific expertise in respiratory medicine or physical therapy. Topics were only included in the quantitative Delphi rounds when they were addressed by three or more experts. Therefore, the controversial issues that were discussed were highly dependent on the panel members' expertise. With specific expertise lacking in respiratory medicine, this might have led to underexposure of certain topics.

Overall, experts in the Delphi study agreed with the guideline's contents. However, divergent topics and discussions addressed in the Delphi study were merely about the contents of the intervention, lacking discussion of its presentation and usability. In retrospect, addressing some practical aspects of the intervention, such as the amount of information and its presentation in a booklet in the Delphi study, may have captured some issues about the guideline's practical use that were encountered later during the process evaluation. Therefore, it would have been useful to consult the panel for their final thoughts on the full version of the practice guideline.

REFLECTIONS ON THE FINDINGS

Observations of discomfort and symptoms

In the pre-intervention phase of our study, the level of discomfort peaked one day after pneumonia diagnosis (mean DS-DAT score (range 0-27): 8.1), then declined and was stable about ten days later (mean DS-DAT score: 4.5). The instruments we used to assess discomfort, (lack of) comfort, pain and shortness of breath have been applied in previous studies, but only few of these studies focused specifically on patients with dementia and pneumonia. A US study conducted in the 1990s used the DS-DAT to compare palliative and aggressive care (i.e. full diagnostic workup and treatment) during fever episodes of which a minimum of 10 of 61 episodes was caused by pneumonia.[19] During the peak of the fever episodes, mean DS-DAT scores ranged from 6 to 10.

With regard to the levels of discomfort, the results of the Dutch pneumonia study (conducted in the late 1990s) can be compared to the findings in our trial. The sample of nursing homes was different for the two studies, but some nursing homes participated in both. Levels of discomfort in 1996-1998 (the Dutch Pneumonia study) as assessed using the DS-DAT at pneumonia diagnosis averaged 11, dropped to a level of 8 after 3 days and 7 after ten days.[12] Figure 1 shows that compared to these findings (1996-1998), discomfort in the pre-intervention period of our study, i.e. 2012-2014 was much lower – at least 2 points lower throughout the course of pneumonia.

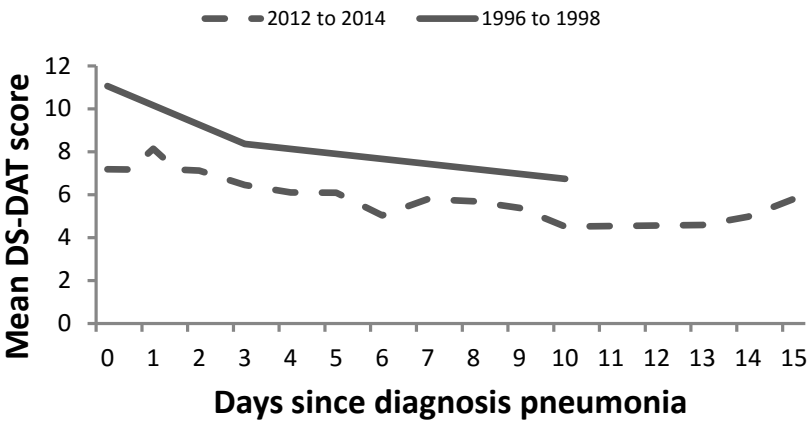

Figure 1: DS-DAT levels in the Dutch pneumonia study (1996-1998)[12] and the pre-intervention phase of the PneuMonitor study (2012-2014); survivors and non-survivors.

We also found some major differences in case mix. Patients in our study had less severe dementia overall, and were judged by the attending physician to be less severely

ill on a 0-9 scale compared to the Dutch Pneumonia Study.[12] Moreover, combining and comparing individual patient data, patients in our study had a better nutritional and hydration status, and 14-day mortality was much lower (20% compared to 38%). Because pneumonia incidence was virtually the same in the two studies (0.093 vs 0.095),[20] a shift in susceptibility to pneumonia or selective inclusion of patients in a way that differed between the studies is unlikely. However, an overall better health condition in our study might explain lower mortality.

The differences in observed discomfort may be attributed to the patients' better health condition as well. However, more treatments were provided in our study, as both antibiotics (77% (1996-1998) compared to 88% (2012-2015)) and symptom-relieving treatments such as opioids, antipyretics, oxygen and corticosteroids were initiated more often. More attention to symptom relief and an increased focus on comfort may have contributed to the drop in discomfort.

Antibiotic treatment

Factors associated with antibiotic treatment

Decisions about whether or not to treat a dementia patient with antibiotics depend on various factors. Our systematic literature study showed that more severe dementia, and a poor prognosis were consistently associated with lower antibiotic use.[21-25] However, considerations vary widely between countries, clearly illustrated by increased severity of the illness – assessed by clinical judgement or using illness indicators – which is associated with more antibiotic treatment in the US and fewer antibiotics in the Netherlands.[3,22] An interplay of several factors may contribute to these large differences for patients with dementia. To name a few, physicians' experience and affinity with palliative care may play a role, just as physicians' presence and the organization of care (e.g. physicians being on the staff as is the case in the Netherlands or not) and the involvement of the patient and his or her family members.[26] More factors likely differ by country, and potentially operate in different directions. However, we were limited in our analyses as only few factors have been compared cross nationally, and in other countries than the US and the Netherlands.

Effects of antibiotics on comfort

Current literature provides contradictory information on the potential of antibiotics to enhance comfort in patients with dementia and pneumonia.[14,27] For example, in the Dutch Pneumonia study, the level of discomfort was generally higher in patients for whom antibiotics were withheld, even though these patients received more symptom relieving treatments, including antipyretics, oxygen and opioids. A randomized study would be the best approach to assess efficacy of antibiotic treatment on comfort, but is difficult because of ethical considerations. Our study aimed to address possible effects

of antibiotics on comfort by comparing patients treated with or without antibiotics in the pre-intervention phase, and by examining associations with antibiotics on top of optimal symptom relief in the intervention phase of the study. To do so, we planned to provide antibiotics for patients with a palliative care goal in the intervention group, only if pre-intervention data would confirm that patients treated with antibiotics were more comfortable than those treated without antibiotics (introduction of this thesis; Figure 2). However, before having reached that stage, pre-intervention data of this study showed that discomfort and symptoms were not different for patients treated with, or without antibiotics. Similar as in the Dutch Pneumonia study, patients who were not treated with antibiotics received more symptom-relieving treatments. However, treatments to relieve pneumonia symptoms for patients treated with antibiotics were more common in our study compared to the Dutch Pneumonia study. These results suggest that on top of optimal symptom relief, antibiotics have no additional benefit for comfort purposes.

Deciding about antibiotic treatment in a dementia patient

When a patient with dementia develops an infection, antibiotics are in most cases still regarded routine treatment. Namely, why withholding a treatment that is probably highly effective, minimally invasive and relatively inexpensive? However, for patients with advanced dementia, the effect of antibiotics on survival is probably limited,[28,29] and even when they prolong life, the patient is still exposed to the deterioration of the dementia, which may be regarded a severe burden in itself.[30,31] But also, the additional benefits of antibiotic treatment on comfort appear to be marginal in our study. For these reasons, we must consider adverse effects both for the individual patient as for public health e.g. taking into account the emergence of antibiotic resistance,[32-34] and we suggest that prescribing antibiotics in patients with dementia is only useful when there are strong arguments for its benefits.

The intervention: characteristics & working mechanism

The intervention we originally aimed to develop was a protocol for optimal symptom relief. Along the way, however, we agreed upon an intervention that was less directive than a protocol: a practice guideline to be used as an aid. This was decided because patients and situations differ and there is no good evidence for one best way to treat (symptoms of) a pneumonia. It is difficult to impose a specific strategy, and therefore, a highly directive guideline was probably not appropriate. Physicians may have felt annoyed or patronized when having too little room for their own considerations. Attitudes towards working according to guidelines may be subject to cultural differences: in German surveys, more physicians felt that guidelines were “cookbook” medicine or a challenge to physician’s autonomy compared to studies with US or Canadian physicians.[35,36]

The decision not to require use of the guideline complicated the assessment of whether physicians actually applied guideline recommendations in the context of the process evaluation, i.e. the level of implementation. The application of specific recommended treatments was not the key mechanism by which we expected the practice guideline to reduce comfort. We hypothesized the practice guideline could reduce pneumonia symptoms in a number of other ways. First, the guideline may increase awareness about the importance of comfort of dementia patients who have developed a pneumonia. Second, with the guideline we provide a more systematic approach. Third, the checklist of pneumonia symptoms and the observational instruments may help for more timely recognition of symptoms.

Non-effectiveness of the intervention

The practice guideline for optimal symptom relief in patients with dementia and pneumonia did not reduce discomfort, (lack of) comfort, pain, and shortness of breath in the randomized controlled trial with an implementation rate of 52-70%. Implementation of the practice guideline may have been suboptimal. Moreover, the barriers that both the qualitative interviews and the quantitative questionnaire addressed provided important clues for the lack of an effect of the practice guideline with regard to the guideline itself, its usability and the implementation.

Contrast with usual practice

The practice guideline we developed listed existing measures to relief pneumonia symptoms, and physicians mentioned that "this is not much different from what we usually do". The literature indicates that high baseline compliance to guideline recommendations may decrease the probability of it being effective, i.e. there is insufficient scope for improvement.[37,38] While claiming to be working according to the guideline already, physicians often referred to the treatment recommendations of the guideline only. However, other components such as the observational instruments (which are not a part of usual practice) were used infrequently. Specific barriers to using these instruments were the physicians' feeling that observations were to be performed by nursing staff, while at the same time physicians were reluctant to ask staff members to perform observations – for example because they expected negative reactions beforehand. But they also raised the point that they felt that they were able to adequately assess symptoms themselves.

Contents and practical use

During the development of the practice guideline in a Delphi study, a multidisciplinary expert panel agreed on the contents of the practice guideline. Furthermore, physicians who used the guideline in the intervention phase of the trial were generally satisfied with the content and components of the guideline and suggested only few ad-

ditions. Nevertheless, the process evaluation revealed that only 42% of physicians felt using the guideline was worth the invested time, and not all found the guideline very practical. For example, some of the physicians had difficulties with the large amount of information, and it was not considered appropriate to browse through a booklet while being with a patient. At the same time, not having the guideline with you all the time was considered a barrier for actually using it. Next to these barriers, highly specific for our guideline, physicians also named general limitations of implementing new interventions or materials in a care setting that played a role, such as the hectic pace of the (nursing home) setting, and correspondingly the lack of time available to familiarize with a new guideline.[39-41]

The researcher's explanations for the non-effectiveness

The practice guideline was not practical enough, so that physicians often did not use it the way we suggested, and this likely explains part of the lack of an intervention effect. Furthermore, the treatment recommendations in the practice guideline for symptom relief contrasted little with usual practice. However, this may not explain the non-effectiveness of the intervention. Namely, we do not know whether discomfort and symptoms would have been relieved when physicians had actually used the parts of the guideline that deviated from current practice, such as the observational instruments. Probably, not the lack of contrast, but the implementation not being convictive enough may be one of the reasons why the guideline failed to reduce discomfort and symptoms. A more substantial implementation procedure may have emphasized the guideline components that are not part of usual practice.

Patients with dementia and pneumonia before death

Discomfort, (lack of) comfort and pain before death

Pneumonia is often the ultimate cause of death for patients with dementia,[42-44] and among patients who were observed in our study, 92 (23%) died within 20 days after pneumonia diagnosis. In the pre-intervention phase, discomfort increased steeply over the seven days preceding death (mean DS-DAT score 7 days before death: 4; day of death: 17). The DS-DAT, PAINAD and EOLD-CAD instruments have been used before to assess discomfort, (lack of) comfort and pain in Dutch nursing home residents with dementia who were expected to die within seven days.[10] The majority of included patients in that study died of dehydration/cachexia. Before death, observed discomfort and pain before death were low compared to the patients in our study (mean DS-DAT score on the day before death: 7.5) and scores remained stable until death. Our findings are in line with earlier findings showing that death from pneumonia involves a high symptom burden and is less comfortable than death from dehydration or cachexia.[14,45]

Discomfort and level of consciousness before death

In the days preceding death, more patients were sleeping during the observations, and comfort was higher for these patients than for those who were observed awake. In 23% of the patients, reduced consciousness was caused by the deliberate lowering of a patient's level of consciousness in the last stages of life: palliative sedation. Palliative sedation is common in nursing home residents,[46,47] and an earlier study reported similar percentages for patients with dementia as in our study (21%).[45]

The level of sleepiness was observed by observers who were unaware of the patients' condition and treatments. Therefore, we were unable to discriminate between e.g. daytime sleep, lowered consciousness due to the illness, a delirium, a side effect of medication to relieve burdensome pneumonia symptoms, or combinations of these. The resulting state – or so called sleep or pseudo-sleep – of the dying patient is in fact a combination of the pathological process, the dehydration, and of symptom relieving treatments: a final common pathway of many terminal disease processes. Insofar as this sedated state results from the side effects of opioids and benzodiazepines, this is not what we call palliative sedation, as the sedation in this situation is a side effect of a treatment primarily aimed at direct symptom relief. In contrast, palliative sedation primarily aims at reducing consciousness and thereby reducing symptoms indirectly.

Despite physicians being aware of the presence of burdensome symptoms before death, discomfort increased when death was approaching for patients who were observed awake. For these patients, we may wonder if symptoms were relieved adequately. On the other hand, a death completely free of suffering and discomfort for all may be an illusion. Apart from information about providing palliative sedation and whether opioids were provided or not, data about medication such as benzodiazepines in the days before death were not collected and these may have contributed to a lower level of consciousness. Although we had only few observations of patients who received palliative sedation, among the patients who were observed asleep shortly before death, discomfort levels appeared lower for those who received palliative sedation, than for others. This suggests there is room for improvement, and that palliative sedation may be considered more often as a means of enhancing comfort in the last days of life.

Changes in discomfort over time

Observed discomfort and symptoms were lower in the intervention phase compared to the pre-intervention phase of the study, both for the intervention homes and homes in the control group. This showed that although levels of discomfort were quite low already, there was nevertheless room for improvement. Discomfort and symptoms decreased gradually in each year of the in total 3.5 years of data collection, but

the largest drop was observed at the transition from the pre-intervention to the intervention phase. Probably not only the implementation meetings in the intervention homes, but also the evaluation meetings at the transition to the intervention phase in the control group homes resulted in regained awareness regarding the study and about comfort for patients with dementia and pneumonia.

The gradual decrease might be explained by more attention for comfort and palliative care in education and media. Furthermore, the regular observations by observers from outside the nursing home, or from other departments may have been an effective intervention in itself; explained by the so-called Hawthorne effect.[48,49] Observers in part of the nursing homes admitted that they sometimes experienced that the nursing staff members felt like their practice and behavior was being monitored. Moreover, nursing staff members often got interested in the study and the reasons for the observer visits. This may have led to a gradual increase in awareness about the importance of comfort, and an increased focus on non-pharmacological comfort measures; regarding the particular patient when they anticipated an observer visit, or more generally.

RECOMMENDATIONS FOR PRACTICE

The practice guideline for optimal symptom relief was not effective in relieving discomfort and pneumonia symptoms in this study. Nevertheless, pre-intervention data, trial results, and the process evaluation together give important clues that are valuable for the treatment of patients with dementia and pneumonia in nursing home practice, which are addressed below.

Using the observational instruments

One of the components of the practice guideline for optimal symptom relief was offering a number of observational instruments for the monitoring of shortness of breath and pain,[5,50-52] but the physicians used them only rarely. Probably, most physicians lack experience and familiarity with the method of using observations for pain, and are not aware of the benefits with regard to timely recognition of symptoms and acting accordingly. For example, systematic routine assessment of pain has shown to improve actual pain management practices in dementia patients.[50,53]

Physicians may become more aware of the availability and the advantages of observational instruments, when possible, early in their career. Observational instruments can be implemented on psychogeriatric wards for use by the nursing staff, which requires repeated training, and practicing sessions to keep staff motivated. When using the in-

struments becomes part of routine, and staff members adequately provide feedback to the attending physicians, this can offer significant advantages and may result in earlier detection of symptoms and more adequate relief of symptoms.

Increasing awareness

Discomfort increased gradually during 3.5 years of collecting data, both in the control homes and intervention homes. This was not due to the intervention, and is likely attributed to awareness about comfort and symptom relief, either due to participation in the current study in the nursing homes or due to external factors. It is therefore suggested that creating awareness may be a more effective intervention than a physician practice guideline only. We address a number of topics for which increasing awareness may make a difference.

- Presence of discomfort: Although addressed in previous research,[12,14,54] the presence of discomfort in patients with pneumonia and dementia is still not generally acknowledged among physicians not specifically interested in the topic. Physicians were sometimes surprised when the need to improve comfort was addressed in introduction meetings, and some raised the point that there are effective treatments to treat potentially distressing symptoms. Not expecting a patient to experience pain, was a reason not to apply pain observational instruments. We cannot judge the treatment of individual patients or a physician's clinical experiences and routines. However, similar as in a previous study,[12] we observed discomfort, which was high when a patient was approaching death. Without acknowledging the presence of discomfort and the need to intervene it is virtually impossible to persuade physicians to change their routines.
- Effects of antibiotics: Discomfort was not different for patients treated with or without antibiotics, and the survival benefit of antibiotic treatment has shown to be marginal for patients with advanced dementia.[28,29,55] When prescribing antibiotics for the treatment of a pneumonia episode in a dementia patient, benefits of treatment must be weighed against potential adverse effects. In an ideal situation every decision to use antibiotics in patients with dementia requires the same considerations as the decision to withhold them.[56-58] Probably not all physicians are aware of these considerations.
- Relieving symptoms before death: Discomfort was high in the days preceding death, and increased when death was near, only for the patients who were observed awake. Physicians should be alert to discomfort and provide optimal symptom relief when death is expected, thereby carefully considering possible side effects in terms of accelerating the dying process and decreased consciousnes.

With regard to recommendations for practice in the Dutch nursing home setting, the

above mentioned topics; the presence of discomfort, effects of antibiotics, and relieving of symptoms before death, may be more prominently addressed in education and further training using research outcomes as a guidance. Increased awareness may further be achieved by more regular discussions among experts, practitioners and staff members. Addressing the topics within a physician's team, may incite physicians to reflect upon their actions more often. Physicians will only be motivated to do this when they acknowledge that there is room for improvement and therefore awareness is the starting point.

RECOMMENDATIONS FOR FURTHER RESEARCH

The study provided clues for change of clinical practice, but also raises questions that may be answered in future work. Suggestions for further research center around factors associated with antibiotic treatment, and the contents, presentation, and implementation of the intervention.

Factors associated with antibiotics

A major drawback of our systematic review of literature was, that we found little parallel comparative studies assessing factors that were associated with antibiotic use in patients with dementia.[22,23,59,60] Moreover, the included studies primarily took place in the Netherlands or in the United States. We suggest to perform a cross-national study in which factors that emerged from the systematic literature review, such as prognosis of a patient, and dementia severity, are systematically investigated to further evaluate antibiotic prescription patterns. Moreover, future observational studies investigating antibiotic prescription patterns should report antibiotic use by type of infection, stage of dementia and goals of antibiotic treatment in different settings. Qualitative studies may expand understanding about attitudes and decision making among healthcare workers, physicians but also patients and family in real practice situations. More data about prevalence of antibiotic use and considerations taken into account when prescribing antibiotics in multiple countries and settings will increase understanding about motivations and underlying mechanisms of decision making about antibiotics, which is valuable for clinical practice.

The intervention

The process evaluation provided clues for improvements of the guideline itself and its implementation that may lead to a more successful reduction of discomfort in patients with dementia and pneumonia.

- Multidisciplinarity: Literature shows that interventions directed at multiple disciplines are in general more effective than those directed at only one.[61,62] The practice guideline focused on the physicians only, who were asked to delegate actions to other disciplines. An adapted intervention should also involve other disciplines including the nursing staff who may have a key role in the signaling and monitoring of symptoms, with or without the use of observational instruments.
- Format: The intervention may be more effective when it would have a more practical format, such as an algorithm, or a stepwise approach, or when it should focus on e.g. communication between disciplines rather than on the contents. Future research should focus on the development of more practical solutions to present the contents of the practice guideline in a more streamlined manner.
- Implementation: Implementation of the practice guideline was likely suboptimal. Especially because the information in the guideline was provided as a list of possible treatment options, physician's felt they knew what was in it already and therefore did not use it very often. However, there may be a gap between knowing what is in a guideline and applying it in practice. Truly familiarizing is needed to become aware of deviations from current routines and to change practice. Future implementation should highlight this, and using the different intervention components more, and employ more intensive strategies for implementation such as audit and feedback and multiple interactive meetings and discussion of cases.[37,63]

International implementation

A next step would be a study examining effects of an adapted intervention for optimal symptom relief followed by international implementation of this intervention. During the developmental procedure of the practice guideline, decisions were made in favor of the national (Dutch) experts and the project team in the case of divergent topics. Therefore, the guideline will have to be reevaluated in each country. This may be achieved by performing an additional Delphi study, with a number of national experts in each country, specifically addressing national controversial topics, after which the guideline is revised.

FINAL REMARKS

The practice guideline for optimal symptom relief was the first evidence- and consensus-based intervention that aimed to reduce discomfort and symptoms for patients with dementia and pneumonia. It its current form, however, the guideline had no added value over usual care. The research presented in this thesis, again stresses the importance of comfort for patients with dementia and pneumonia, and shows that there was still room for improvement. On the other hand, comfort in patients

with dementia and pneumonia has increased over the years, and also the number of treatments initiated to relieve pneumonia symptoms. Furthermore, discomfort and symptoms gradually declined during the data collection of the study in this thesis. These very favorable developments that occurred in a time span of 15-20 years between studies, and in 3.5 years during this study, are both likely attributed to creating awareness about the subject of discomfort – in any form. Further research should take the concept of awareness as a starting point to continue the search for the best way to provide ultimate symptom relief and comfort for patients with dementia and pneumonia.

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